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EXAMINER	
RENNER, CRAIG A	

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2627	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/823,474	SAITO ET AL.	
	Examiner	Art Unit	
	Craig A. Renner	2627	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 April 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) *4-6 and 12-14* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,7-11,15 and 16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Claims 4-6 and 12-14 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to one or more non-elected inventions/species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 29 November 2006.

Information Disclosure Statement

2. The information disclosure statement filed 01 May 2006 again fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. Although applicant indicates that "applicant submits herewith a document designated as C7 - Copy of Examination Report issued on February 10, 2006 for corresponding British Patent Application No. 0600037.6 listed in Form PTO-1449 of the IDS submitted April 27, 2006," a copy of the document listed as item **C7** cannot be found with the submission and is not present in the file record. The information disclosure statement has been placed in the application file, but the information pertaining to the document listed as item **C7** referred to therein has not been considered.

Drawings

3. The drawings were received on 13 April 2004. These drawings are accepted.

Double Patenting

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

5. Claims 1-3, 7-11 and 15-16 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-13 of copending Application No. 10/823,473. Although the conflicting claims are not identical, they are not patentably distinct from each other because the only difference between the patented and present claims is that the present claims do not call for an "antiferromagnetic layer."

Official notice is taken of the fact that it is notoriously old and well known in the art to omit one or more elements and their functions in a combination where the remaining elements perform the same functions as before. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have not claimed an antiferromagnetic layer in copending Application No. 10/823,473. The rationale is as follows:

One of ordinary skill in the art would have been motivated to have not claimed an antiferromagnetic layer in copending Application No. 10/823,473 since it is notoriously old and well known in the art to omit one or more elements and their function in a combination where the remaining elements perform the same functions as before, and since it has been held that omission of an element and its function in a combination where the remaining elements perform the same functions as before involves only routine skill in the art, *In re Karlson*, 136 USPQ 184 (CCPA 1963).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

6. Claims 1-3, 7-11 and 15-16 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over allowed claims 1, 4-16 and 47-72 of copending Application No. 10/823,484. Although the conflicting claims are not identical, they are not patentably distinct from each other because the only difference between the patented and present claims is that the present claims do not call for an "antiferromagnetic layer."

Official notice is taken of the fact that it is notoriously old and well known in the art to omit one or more elements and their functions in a combination where the remaining elements perform the same functions as before. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have not claimed an antiferromagnetic layer in copending Application No. 10/823,484. The rationale is as follows:

One of ordinary skill in the art would have been motivated to have not claimed an antiferromagnetic layer in copending Application No. 10/823,484 since it is notoriously old and well known in the art to omit one or more elements and their function in a combination where the remaining elements perform the same functions as before, and since it has been held that omission of an element and its function in a combination where the remaining elements perform the same functions as before involves only routine skill in the art, *In re Karlson*, 136 USPQ 184 (CCPA 1963).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1, 2, 7, 9, 10 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakatani et al. (US 5,390,061).

Nakatani teaches a CPP giant magnetoresistive head comprising lower and upper shield layers (15 and 16, for instance) with a predetermined shield distance therebetween (as shown in FIG. 10, for instance); and a giant magnetoresistive element disposed between the upper and lower shield layers (as shown in FIG. 10, for instance), the giant magnetoresistive element having a group of adjacent parallel layers (includes layers 2, 3 and 4, for instance), the group comprising a pinned magnetic layer (2, see lines 13-16 in column 9, for instance, i.e., the larger coercive force of layer 2 results in layer 2 being pinned to at least some extent), a free magnetic layer (4) and a nonmagnetic layer (3) disposed between the pinned magnetic layer and the free magnetic layer (as shown in FIG. 1, for instance), the group being free of an antiferromagnetic layer parallel to any layers of the group (as shown in FIG. 1, for instance), wherein a current flows in a direction perpendicular to a film plane of the giant magnetoresistive element (as shown in FIG. 1, for instance, i.e., due to the electrode arrangement), and wherein the pinned magnetic layer extends to a rear of the nonmagnetic layer and the free magnetic layer in a height direction (as shown in FIG. 1, for instance), and a dimension of the pinned magnetic layer in a height direction is

larger than that in a track width direction (as shown in FIG. 1, for instance) [as per claim 1]; wherein the pinned magnetic layer comprises a magnetic material having a positive magnetostriction constant or a magnetic material having high coercive force (lines 13-16 in column 9, for instance, i.e., a magnetic material having high coercive force), and an end of the pinned magnetic layer is exposed at a surface facing a recording medium (as shown in FIG. 1, for instance) [as per claims 2, 9 and 10]; and wherein the head further comprises large-area nonmagnetic metal films (1 and 6) provided between the giant magnetoresistive element and the lower shield layer and between the giant magnetoresistive element and the upper shield layer, respectively (as shown in FIG. 1 relative to FIG. 10, for instance), so that the large-area nonmagnetic metal films are in direct contact with the pinned magnetic layer and the free magnetic layer (as shown in FIG. 1, for instance) and have larger areas than those of the pinned magnetic layer and the free magnetic layer, respectively (as shown in FIG. 1, for instance) [as per claims 7 and 15].

9. Claim 9 is rejected under 35 U.S.C. 102(b) as being anticipated by Dill et al. (US 5,898,548).

Dill teaches a CPP giant magnetoresistive head comprising lower and upper shield layers (S1 and S2) with a predetermined shield distance (S) therebetween (as shown in FIG. 4B, for instance); and a giant magnetoresistive element disposed between the upper and lower shield layers (as shown in FIG. 4B, for instance), the giant magnetoresistive element having a group of adjacent parallel layers (includes 118, 120

and 132, for instance), the group comprising a pinned magnetic layer (118), a free magnetic layer (132) and a nonmagnetic layer (120) disposed between the pinned magnetic layer and the free magnetic layer (as shown in FIG. 4B, for instance), the group being free of an antiferromagnetic layer (116) parallel to any layers of the group (as shown in FIG. 4B, for instance, i.e., the antiferromagnetic layer is disposed outside of the group of layers), wherein a current (I) flows in a direction perpendicular to a film plane of the giant magnetoresistive element (as shown in FIG. 4A, for instance); and wherein the pinned magnetic layer comprises a magnetic material having a positive magnetostriction constant or a magnetic material having high coercive force (lines 1-3 in column 8, for instance, i.e., a magnetic material having high coercive force), and an end of the pinned magnetic layer is exposed at a surface facing a recording medium (as shown in FIG. 4B, for instance).

10. Claims 9 and 11 are rejected under 35 U.S.C. 102(a) and/or 35 U.S.C. 102(e) as being anticipated by Saito (US 2003/0103299).

Saito teaches a CPP giant magnetoresistive head comprising lower and upper shield layers (20 and 31) with a predetermined shield distance therebetween (as shown in FIG. 8, for instance); and a giant magnetoresistive element disposed between the upper and lower shield layers (as shown in FIG. 8, for instance), the giant magnetoresistive element having a group of adjacent parallel layers (includes layers 28c, 28b, 28a, 42, 27, 41, 26b, and 26a, for instance), the group comprising a pinned magnetic layer (42/28a/28b/28c), a free magnetic layer (26a/26b/41) and a nonmagnetic

layer (27) disposed between the pinned magnetic layer and the free magnetic layer, the group being free of an antiferromagnetic layer (29) parallel to any layers of the group (as shown in FIG. 8, for instance, i.e., the antiferromagnetic layer is disposed outside of the group of layers), wherein a current flows in a direction perpendicular to a film plane of the giant magnetoresistive element (paragraph [0057] on page 4, for instance); and wherein the pinned magnetic layer comprises a magnetic material having a positive magnetostriction constant or a magnetic material having high coercive force (paragraph [0263] on page 16, for instance, i.e., each of "Co_2MnSi, Co_2MnGe, Co_2MnSn, [and] Co_2MnAl," for instance, is a magnetic material having a positive magnetostriction constant or a magnetic material having high coercive force), and an end of the pinned magnetic layer is exposed at a surface facing a recording medium (as shown in FIG. 8, for instance) [as per claim 9]; wherein the pinned magnetic layer has a laminated ferrimagnetic structure comprising a first pinned magnetic layer (42/28a) and a second pinned magnetic layer (28c) which are laminated with a nonmagnetic intermediate layer (28b) disposed therebetween (as shown in FIG. 8, for instance), and the first and second pinned magnetic layers partially or entirely comprises Fe-Co-Cu (wherein Fe > 10 atomic percent, Co > 30 atomic percent, and Cu > 5 atomic percent), Fe-Co-Cu-X (wherein X is at least one element of Pt, Pd, Mn, Si, Au, and Ag), or Co_2MnY (wherein Y is at least one element of Ge, Si, Sn, and Al) (paragraph [0263] on page 16, for instance, i.e., "Co_2MnSi, Co_2MnGe, Co_2MnSn, [and] Co_2MnAl," for instance) [as per claim 11].

11. Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Carey et al. (US 6,757,144).

Carey teaches a CPP giant magnetoresistive head comprising lower and upper shield layers (302 and 346) with a predetermined shield distance therebetween (as shown in FIG. 32, for instance); and a giant magnetoresistive element disposed between the upper and lower shield layers (as shown in FIG. 32, for instance), the giant magnetoresistive element having a group of adjacent parallel layers (includes layers 326, 328 and 330, for instance), the group comprising a pinned magnetic layer (330), a free magnetic layer (326) and a nonmagnetic layer (328) disposed between the pinned magnetic layer and the free magnetic layer (as shown in FIG. 32, for instance), the group being free of an antiferromagnetic layer (332) parallel to any layers of the group (as shown in FIG. 32, for instance, i.e., the antiferromagnetic layer is disposed outside of the group of layers), wherein a current flows in a direction perpendicular to a film plane of the giant magnetoresistive element (lines 54-56 in column 8, for instance), and wherein the pinned magnetic layer extends to a rear of the nonmagnetic layer and the free magnetic layer in a height direction (as shown in FIG. 32, for instance), and a dimension of the pinned magnetic layer in a height direction is larger than that in a track width direction (as shown in FIG. 31, for instance).

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. Claims 3, 8, 11 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakatani et al. (US 5,390,061).

Nakatani teaches the head as detailed in paragraph 8, supra. Nakatani, however, remains silent as to the pinned magnetic layer having a "laminated ferrimagnetic structure comprising a first pinned magnetic layer and a second pinned magnetic layer which are laminated with a nonmagnetic intermediate layer disposed therebetween, and the first and second pinned magnetic layers partially or entirely comprises Fe-Co-Cu (wherein Fe > 10 atomic percent, Co > 30 atomic percent, and Cu > 5 atomic percent), Fe-Co-Cu-X (wherein X is at least one element of Pt, Pd, Mn, Si, Au, and Ag), or Co_2MnY (wherein Y is at least one element of Ge, Si, Sn, and Al)" as per claims 3 and 11, and as to the large-area nonmagnetic metal film disposed between the giant magnetoresistive element and the lower shield layer comprising "any one of Ta/Cu, Ta/Ru/Cu, Ta/Cr, Ta/Ni-Cr, Ta/(Ni-Fe)-Cr, and Cr, and when the composition contains Cr, the Cr content exceeds 20 atomic percent" as per claims 8 and 16.

Nakatani does, however, teach that the large-area nonmagnetic metal film disposed between the giant magnetoresistive element and the lower shield layer is an electrode. Official notice is taken of the fact that a laminated ferrimagnetic structure comprising a first pinned magnetic layer and a second pinned magnetic layer which are laminated with a nonmagnetic intermediate layer disposed therebetween is a

notoriously old and well known pinned magnetic layer configuration in the art. Official notice is also taken of the fact that at least one of Fe-Co-Cu (wherein Fe > 10 atomic percent, Co > 30 atomic percent, and Cu > 5 atomic percent), Fe-Co-Cu-X (wherein X is at least one element of Pt, Pd, Mn, Si, Au, and Ag), and Co_2MnY (wherein Y is at least one element of Ge, Si, Sn, and Al) is a notoriously old and well known pinned magnetic layer material in the art. Official notice is lastly taken of the fact that at least one of Ta/Cu, Ta/Ru/Cu, Ta/Cr(>20 at%), Ta/Ni-Cr(>20 at%), Ta/(Ni-Fe)-Cr(>20 at%), and Cr is a notoriously old and well known electrode material in the art. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have had the pinned magnetic layer of Nakatani have a laminated ferrimagnetic structure comprising a first pinned magnetic layer and a second pinned magnetic layer which are laminated with a nonmagnetic intermediate layer disposed therebetween, and the first and second pinned magnetic layers of Nakatani partially or entirely comprise Fe-Co-Cu (wherein Fe > 10 atomic percent, Co > 30 atomic percent, and Cu > 5 atomic percent), Fe-Co-Cu-X (wherein X is at least one element of Pt, Pd, Mn, Si, Au, and Ag), or Co_2MnY (wherein Y is at least one element of Ge, Si, Sn, and Al), and the large-area nonmagnetic metal film disposed between the giant magnetoresistive element and the lower shield layer of Nakatani comprise any one of Ta/Cu, Ta/Ru/Cu, Ta/Cr, Ta/Ni-Cr, Ta/(Ni-Fe)-Cr, and Cr, and when the composition contains Cr, the Cr content exceeds 20 atomic percent. The rationale is as follows:

One of ordinary skill in the art would have been motivated to have had the pinned magnetic layer of Nakatani have a laminated ferrimagnetic structure comprising a first

pinned magnetic layer and a second pinned magnetic layer which are laminated with a nonmagnetic intermediate layer disposed therebetween since such is a notoriously old and well known pinned magnetic layer configuration in the art, and since selecting a known pinned magnetic layer configuration on the basis of its suitability for the intended use is considered to be within the level of ordinary skill in the art.

One of ordinary skill in the art would have been motivated to have had the first and second pinned magnetic layers of Nakatani partially or entirely comprise Fe-Co-Cu (wherein Fe > 10 atomic percent, Co > 30 atomic percent, and Cu > 5 atomic percent), Fe-Co-Cu-X (wherein X is at least one element of Pt, Pd, Mn, Si, Au, and Ag), or Co_2MnY (wherein Y is at least one element of Ge, Si, Sn, and Al) since at least one of Fe-Co-Cu (wherein Fe > 10 atomic percent, Co > 30 atomic percent, and Cu > 5 atomic percent), Fe-Co-Cu-X (wherein X is at least one element of Pt, Pd, Mn, Si, Au, and Ag), and Co_2MnY (wherein Y is at least one element of Ge, Si, Sn, and Al) is a notoriously old and well known pinned magnetic layer material in the art, and since selecting a known material on the basis of its suitability for the intended use is within the level of ordinary skill in the art, *In re Leshin*, 125 USPQ 416 (CCPA 1960).

One of ordinary skill in the art would have been motivated to have had the large-area nonmagnetic metal film disposed between the giant magnetoresistive element and the lower shield layer of Nakatani comprise any one of Ta/Cu, Ta/Ru/Cu, Ta/Cr, Ta/Ni-Cr, Ta/(Ni-Fe)-Cr, and Cr, and when the composition contains Cr, the Cr content exceeds 20 atomic percent since Nakatani teaches that the large-area nonmagnetic metal film disposed between the giant magnetoresistive element and the lower shield

layer is an electrode and at least one of Ta/Cu, Ta/Ru/Cu, Ta/Cr(>20 at%), Ta/Ni-Cr(>20 at%), Ta/(Ni-Fe)-Cr(>20 at%), and Cr is a notoriously old and well known electrode material in the art, and since selecting a known material on the basis of its suitability for the intended use is within the level of ordinary skill in the art. See *In re Leshin*, supra.

Response to Arguments

14. Applicant's arguments filed 26 April 2007 have been fully considered but they are not persuasive.

The applicant argues that "the structure in Nakatani is NOT free of an antiferromagnetic layer in the layers forming the GMR effect element." This argument, however, is not found to be persuasive as the claims do not call for the structure to be "free of an antiferromagnetic layer in the layers forming the GMR effect element." The claims merely call for "the GMR element having a group of adjacent parallel layers, the group comprising a pinned magnetic layer, a free magnetic layer and a nonmagnetic layer disposed between the pinned magnetic layer and the free magnetic layer, said group being free of an antiferromagnetic layer parallel to any layers of the group." Nakatani teaches a giant magnetoresistive element having a group of adjacent parallel layers (includes layers 2, 3 and 4, for instance), the group comprising a pinned magnetic layer (2, see lines 13-16 in column 9, for instance, i.e., the larger coercive force of layer 2 results in layer 2 being pinned to at least some extent), a free magnetic layer (4) and a nonmagnetic layer (3) disposed between the pinned magnetic layer and

the free magnetic layer (as shown in FIG. 1, for instance), the group being free of an antiferromagnetic layer parallel to any layers of the group (as shown in FIG. 1, for instance).

The applicant also contends that the "element of being FREE of an antiferromagnetic layer in the parallel layers of the GMR element is missing in Dill." This argument, however, is not found to be persuasive as the claims do not call for the element to be "FREE of an antiferromagnetic layer in the parallel layers of the GMR element." The claims merely call for "the GMR element having a group of adjacent parallel layers, the group comprising a pinned magnetic layer, a free magnetic layer and a nonmagnetic layer disposed between the pinned magnetic layer and the free magnetic layer, said group being free of an antiferromagnetic layer parallel to any layers of the group." Dill teaches a giant magnetoresistive element having a group of adjacent parallel layers (includes 118, 120 and 132, for instance), the group comprising a pinned magnetic layer (118), a free magnetic layer (132) and a nonmagnetic layer (120) disposed between the pinned magnetic layer and the free magnetic layer (as shown in FIG. 4B, for instance), the group being free of an antiferromagnetic layer (116) parallel to any layers of the group (as shown in FIG. 4B, for instance, i.e., the antiferromagnetic layer is disposed outside of the group of layers). The limitation "said group being free of an antiferromagnetic layer" does not preclude an antiferromagnetic layer from being immediately adjacent to the group.

The applicant further asserts that Saito does not teach that "the giant magnetoresistive (GMR) element is free of an antiferromagnetic layer in the group of

parallel layers. That is, no antiferromagnetic layer is required in the GMR structure." This argument, however, is not found to be persuasive as the claims do not call for the element to be "free of an antiferromagnetic layer in the group of parallel layers" and "no antiferromagnetic layer is required in the GMR structure." The claims merely call for "the GMR element having a group of adjacent parallel layers, the group comprising a pinned magnetic layer, a free magnetic layer and a nonmagnetic layer disposed between the pinned magnetic layer and the free magnetic layer, said group being free of an antiferromagnetic layer parallel to any layers of the group." Saito teaches a giant magnetoresistive element having a group of adjacent parallel layers (includes layers 28c, 28b, 28a, 42, 27, 41, 26b, and 26a, for instance), the group comprising a pinned magnetic layer (42/28a/28b/28c), a free magnetic layer (26a/26b/41) and a nonmagnetic layer (27) disposed between the pinned magnetic layer and the free magnetic layer, the group being free of an antiferromagnetic layer (29) parallel to any layers of the group (as shown in FIG. 8, for instance, i.e., the antiferromagnetic layer is disposed outside of the group of layers). The limitation "said group being free of an antiferromagnetic layer" does not preclude an antiferromagnetic layer from being immediately adjacent to the group.

The applicant lastly maintains that Carey does not teach that "the giant magnetoresistive (GMR) element is free of an antiferromagnetic layer in the group of parallel layers. That is, no antiferromagnetic layer is required in the GMR structure." This argument, however, is not found to be persuasive as the claims do not call for the element to be "free of an antiferromagnetic layer in the group of parallel layers" and "no

antiferromagnetic layer is required in the GMR structure." The claims merely call for "the GMR element having a group of adjacent parallel layers, the group comprising a pinned magnetic layer, a free magnetic layer and a nonmagnetic layer disposed between the pinned magnetic layer and the free magnetic layer, said group being free of an antiferromagnetic layer parallel to any layers of the group." Carey teaches a giant magnetoresistive element having a group of adjacent parallel layers (includes layers 326, 328 and 330, for instance), the group comprising a pinned magnetic layer (330), a free magnetic layer (326) and a nonmagnetic layer (328) disposed between the pinned magnetic layer and the free magnetic layer (as shown in FIG. 32, for instance), the group being free of an antiferromagnetic layer (332) parallel to any layers of the group (as shown in FIG. 32, for instance, i.e., the antiferromagnetic layer is disposed outside of the group of layers). The limitation "said group being free of an antiferromagnetic layer" does not preclude an antiferromagnetic layer from being immediately adjacent to the group.

Conclusion

15. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Craig A. Renner whose telephone number is (571) 272-7580. The examiner can normally be reached on Tuesday-Friday 9:00 AM - 7:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on (571) 272-7579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Craig A. Renner
Primary Examiner
Art Unit 2627

CAR